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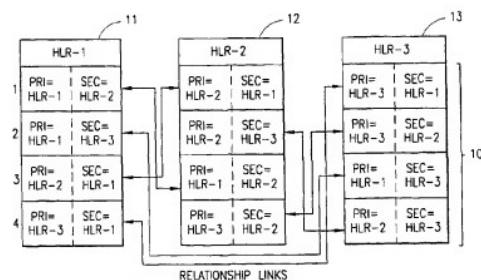
09/177,457 22 October 1998 (22.10.1998) US

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(54) Title: DYNAMIC HLR REDUNDANCY IN A RADIO TELECOMMUNICATIONS NETWORK

**WO 00/024216 A3**

(57) Abstract: A system and method of providing dynamic redundancy of home location registers (HLRs) for a plurality of subscribers in a radio telecommunications network having a plurality of HLRs (11-15), each of which has excess memory capacity for storing subscriber records. Each of the HLRs in the network operates as both a primary HLR and a secondary HLR. Subscriber records (10) in each HLR are divided into a plurality of subsets of known size. For each subset of records in a particular HLR, another HLR in the network is designated as the secondary HLR. The primary HLR (11) and the secondary HLR (12) for each subscriber are identified to the network through new subscriber categories. A heartbeat signal is periodically sent back and forth between the primary HLR and the secondary HLR in each HLR pair to convey the operational status of each HLR in the pair. If the heartbeat signal is not received in a secondary HLR, the secondary HLR sends to the network a Qualification Directive (QUALDIR) Invoke message directing the network (21) to utilize the secondary HLR sending the message as the new primary HLR for the assigned subset. The secondary HLR records all changes made to its subscriber records until the primary HLR is operational, and the heartbeat signal is resumed. The secondary HLR then updates the primary HLR, and the primary HLR is redesignated as the primary HLR.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/01766

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38, G06F 17/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5555404 A (OYSTEIN TORBJØRNSEN ET AL), 10 Sept 1996 (10.09.96), column 1, line 50 - line 62; column 2, line 2 - line 4; column 2, line 14 - line 16, abstract, column 2, line 20 - line 56	1-2,4-5, 7-11,13-19
X		20
A		3,6,12
Y	WO 9621981 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 18 July 1996 (18.07.96), page 3, line 22 - line 25; page 3, line 37 - page 4, line 8; page 8, line 34 - page 9, line 6, abstract	1-2,13-14
A		3-12,15-19

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- *C* documents which may throw doubts on priority claimed or which is cited in connection with the publication date of another citation or other special reason (as specified)
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- *Z* document member of the same patent family

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9741703 A1 (ERICSSON INC.), 6 November 1997 (06.11.97), page 11, line 1 - line 10; page 13, line 7 - line 16; page 20, line 36 - page 21, line 13, abstract, page 22, line 3 - line 32	4-5,7-11, 15-19
A	-----	1-3,6,12-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5555404 A	10/09/96	US 5423037 A	06/06/95
WO 9621981 A2	18/07/96	AU 4460796 A CA 2209900 A EP 0804842 A FI 972958 A JP 10512122 T US 5623532 A	31/07/96 18/07/96 05/11/97 12/09/97 17/11/98 22/04/97
WO 9741703 A1	06/11/97	AU 2819797 A CA 2253266 A EP 0896781 A US 5953662 A	19/11/97 06/11/97 17/02/99 14/09/99